REMARKS

There are three independent claims pending in the amended application – claims 15, 35, and 39. All of the claims contain the following limitations:

> applying a piezoelectric pulse sensor to the patient at a location near a blood vessel that expands as a result of blood pulsing through the vessel, the piezoelectric pulse sensor being configured to detect mechanical motion resulting from the expansion of the blood vessel;
>
> processing the output of the piezoelectric sensor to make a decision as to whether the patient has a pulse, wherein the decision is based primarily on outputs of the piezoelectric sensor attributable to the mechanical motion resulting from the expansion of the blood vessel rather than on outputs attributable to sounds from opening and closing of heart valves

The examiner rejected claims 15 and 35 (claim 39 is newly presented) under 35 U.S.C. §102(e) as anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over Joo (US 6440082). The examiner is urged to reconsider and withdraw the rejections.

The invention as set forth in each of the independent claims concerns detecting whether a patient has a pulse by using a piezoelectric sensor to detect mechanical motion resulting from the expansion of a blood vessel. Claims 15 and 35 have been amended, and claim 39 written, to include a limitation requiring that the output of the piezoelectric sensor be processed to make a decision as to whether the patient has a pulse, with the decision being based primarily on outputs of the piezoelectric sensor attributable to the mechanical motion resulting from the expansion of the blood vessel.

Joo teaches using a piezoelectric sensor to detect the very thing that the claims indicate is not the objective the invention – sounds from opening and closing of heart valves. Joo pursues a conventional approach to detecting whether a patient has a pulse – listening for the sounds of a

pumping heart. But this is a distinctly unreliable method of pulse detection because the frequencies of interest in the output of the sensor reside in the standard audio frequency range. The invention, by contrast, processes the output of the piezoelectric sensor to detect the lower frequency information associated with the mechanical motion resulting from expansion of a blood vessel. This mechanical motion is generally not accompanied by sound, and can be detected without attempting to interpret information in the standard audio frequency range. The result is a considerable improvement in pulse detection over the prior art sound-detection approach exemplified by Joo.

The examiner's discussion of our prior arguments (page 2 of the office action) suggests that the examiner is of the view that the piezoelectric sensor of Joo would inherently detect mechanical motion, as well as sound. Actually, this is not true, and the examiner has no support for that conclusion. Not every piezoelectric sensor will be sensitive to the lower frequencies associated with mechanical motion caused by expansion of a blood vessel. But the amendments made herein to the claims make the distinction over Joo even clearer, as the claims now require that the output of the piezoelectric sensor be processed "to make a decision as to whether the patient has a pulse, wherein the decision is based primarily on outputs of the piezoelectric sensor attributable to the mechanical motion resulting from the expansion of the blood vessel rather than on outputs attributable to sounds from opening and closing of heart valves". Joo does the opposite of what the claim requires. It processes the output of the sensor to make a decision about whether the patient has a pulse based primarily on outputs attributable to sounds from opening and closing of heart valves.

Accordingly, the independent claims are in condition for allowance.

The remaining claims are all properly dependent on one or more of the independent claims, and thus allowable therewith. Each of the dependent claims adds one or more further limitations that enhance patentability, but those limitations are not presently relied upon. For that reason, and not because applicants agree with the examiner, no rebuttal is offered to the examiner's reasons for rejecting the dependent claims.

Allowance of the application is requested.

Please apply any other charges or credits to deposit account 06-1050.

Respectfully submitted,

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